

Mobile-Satellite Service. The Notice of Proposed Rulemaking (NPRM) in the Docket was released on January 30, 1995.

II. Purpose

The action proposed in the Docket was initiated to allocate frequency spectrum for use by the mobile-satellite service at 2 GHz. This action would displace a number of existing 2 GHz users. Carl T. Jones Corporation has undertaken studies to determine the current user population in the affected frequency band 1990-2110 MHz and assess the cost associated with affected user migration and displacement to alternate frequency bands.

III. Background

The Commission proposes to reallocate 1990-2025 MHz (Earth-to-Space) to the mobile-satellite service (MSS). This frequency spectrum is currently occupied by Broadcast Auxiliary Service (BAS) licensees. The BAS licensees use these frequencies for Television Pickup, Television Studio-Transmitter-Link, Television Relay and Television Translator Relay stations.

Pursuant to Section 74.602 of the FCC Rules, there are three Frequency Bands allotted to microwave BAS facilities for use by television licensees. These frequency bands are designated as: Band A (1990 to 2110 MHz and 2450 to 2483.5 MHz); Band B (6875 to 7125 MHz) and Band D (12.7 to 13.25 GHz).

The Commission's proposed action in ET Docket 95-18 directly affects the current user population in frequency Band A. The Commission initially proposes to reallocate the lower 35 MHz frequency segment of Band A (i.e. 1990-2110 MHz) to MSS users. To accommodate the displaced BAS users, the Commission proposes to establish a new 35 MHz frequency segment 2110 to 2145 MHz. Frequency Bands B and D are largely unaffected by the Proposed Rulemaking with the exception of increased congestion due to possible facility migration.

IV. Frequency Data

The frequency data presented herein was obtained from Communications Engineering Technology, Inc. (CET), of Edgewater, Florida. CET maintains a current version of the FCC license master file for all services.

This office purchased the pertinent frequency data block from CET and developed a custom Fortran search program to interpret the large quantity of data. The output data from the Fortran program was imported to a custom designed Lotus spreadsheet to sort and count the appropriate license records and eliminate duplicate records as necessary.

In Frequency Band A, 91.3% of the total licenses are issued to BAS licensees. The results presented herein consider the total number of licensees operating in the affected frequency bands. However, because the BAS licensees constitute an overwhelming majority of the total number of licensees in Band A, the results presented herein assume all affected licensees are authorized in the BAS. This assumption allows for a consistent cost basis for equipment replacement, licensing and engineering for a given facility.

Our study revealed that 54.1% of the FCC licenses in Band A are duplicate call sign authorizations. A BAS station is commonly frequency agile, and is licensed to operate on one or more of the nine channels in Band A. For example, BAS station KA-35272 is licensed to operate on eight channels in Band A. As a result, KA-35272 appears in the frequency database eight times. In reality, KA-35272 is only one frequency agile station.

The results presented herein are referenced to "Affected Stations". An Affected Station is an existing license, assigned a unique call sign, in a given frequency range. BAS station KA-35272 is considered herein as one Affected Station.

V. Results -- Facility Migration

The attached graphs present the results of the current population study in each BAS frequency band as defined in Section 74.602 of the FCC Rules. Graph 1 is a representation of the total number of licensees in Band A, Band B and Band D in relation to the total number of unique call sign authorizations. Graph 2 is a representation of the total number of licensees in Band A, Band B and Band D as compared to the total number of BAS licensees. Graph 3 is a representation of the total number of fixed and mobile licensees in Band A, Band B and Band D.

The Estimated Burden of Facility Migration, in terms of both affected user population and cost is presented in Table 1 for fixed station users and Table 2 for mobile station users. Each Table considers three alternatives for a given segment of the affected users. The first horizontal row of the Tables present an estimate of the costs

associated with relocating the Affected Stations on Channel 1 to: (1) the new 35 MHz frequency segment; (2) the existing Band B; and (3) the existing Band D. The second horizontal row considers the migration costs associated with relocating the Affected Stations on Channels 1 and 2 to the same three frequency segments. The third horizontal row considers the migration costs associated with relocating the Affected Stations on Channels 1 through 7 to the same three frequency segments.

Frequency Band A - Current Population

Of the 4000 unique call sign authorizations in Band A, 2586 are fixed point-to-point microwave stations and 1420 are mobile microwave stations licensed to a specific area of operation. There are 860 fixed microwave service stations and 551 mobile stations authorized to operate on Channel 1 (1990 to 2008 MHz). There are 1076 fixed microwave service stations and 687 mobile stations Channels 1 and 2 (1990 to 2025 MHz). There are 2209 fixed microwave service stations and 1134 mobile stations Channels 1 through 7 (1990 to 2110 MHz).

Frequency Band B - Current Population

This frequency band is unaffected by FCC reallocation plans with the exception of increased congestion due to possible facility migration. Our studies revealed that 99.7% of the total licenses the FCC issues in Band B are issued to BAS licensees. Only 12.1% of the FCC licenses in Band B are duplicate call sign authorizations. Of the 5979 unique call sign authorizations in Band B, 5275 are fixed point-to-point microwave stations and 714 are mobile microwave stations licensed to a specific area of operation.

Frequency Band D - Current Population

This frequency band is also unaffected by FCC reallocation plans with the exception of increased congestion due to possible facility migration. Our studies revealed that 93.8% of the total licenses the FCC issues in Band D are issued to BAS licensees. Further, it was discovered that 31.6% of the FCC licenses in Band D are duplicate call sign authorizations. Of the 2618 unique call sign authorizations in Band D, 1985 are fixed point-to-point microwave stations and 636 are mobile microwave stations licensed to a specific area of operation.

VI. Facility Migration Assumptions and Results

Fixed BAS Stations

The following items were considered during the cost analysis of relocating the existing fixed BAS stations to an alternate frequency band. The cost per station figures were determined based upon the cost of FCC Application and engineering, terminal hardware, and installation. All of the assumptions made in this report are based on direct consultations with the specific equipment manufacturer. It was through these conversations that it was discovered that the existing antennas currently used in the 1990 - 2025 MHz frequency segment (Channel 1) would not be usable in the new 2110 - 2145 MHz frequency segment.

The findings in this report assume that fixed stations migrating to the new 35 MHz frequency segment (2110 to 2145 MHz) would require a new transmitter, receiver, transmit antenna, and receive antenna. The original transmission line at both the transmit

and receive terminal would be reusable. Further, fixed stations migrating to Band B (6875 to 7125 MHz) would require new transmission line at both terminals, a new transmitter, receiver, transmit antenna and receive antenna.

Finally, assumptions for migration to Band D (12.7 to 13.25 GHz) are that all fixed stations would require new transmission line at both terminals, a new transmitter, receiver, transmit antenna and receive antenna. In addition, because of diminished propagation characteristics a complete repeater system is necessary for 25% of the stations which migrate to Band D.

A detailed cost breakdown for each alternative is submitted in Appendix A for Fixed BAS stations.

Mobile BAS Stations

The following items were considered during the cost analysis of relocating the existing mobile BAS stations to an alternate frequency band. The cost per station figures were determined based upon the number of Electronic News Gathering (ENG) units and Portable units per station, (According to a January, 1992. NAB survey there are approximately 1.7 ENG transmitters and 2 ENG receivers per station and 1.48 Portable transmitters and 0.8 portable receive units per call sign) and system hardware requirements. For ENG units only, the cost of FCC Application, engineering and installation was considered.

It was assumed that mobile BAS stations migrating to the new 35 MHz frequency segment (2110 to 2145 MHz) would require a new transmitter, receiver, transmit antenna and receive antenna. The original transmission line at both the transmit and receive

terminal would be reusable. Further, it was assumed that fixed stations migrating to Band B (6875 to 7125 MHz) would require new transmission line at both terminals, a new transmitter, receiver, transmit antenna and receive antenna. Because of diminished propagation characteristics a steerable receive antenna is necessary for 20% of the ENG stations which migrate to this band.

Finally, assumptions for migration to Band D (12.7 to 13.25 GHz) are that all fixed stations would require new transmission line at both terminals, a new transmitter, receiver, transmit antenna and receive antenna. In addition, because of diminished propagation characteristics a steerable receive antenna is necessary for 50% of the ENG stations which migrate to Band D.

A detailed cost breakdown for each alternative is submitted in Appendix B for Mobile BAS stations.

This report has been prepared by me or under my direct supervision and it is believed to be true and correct.

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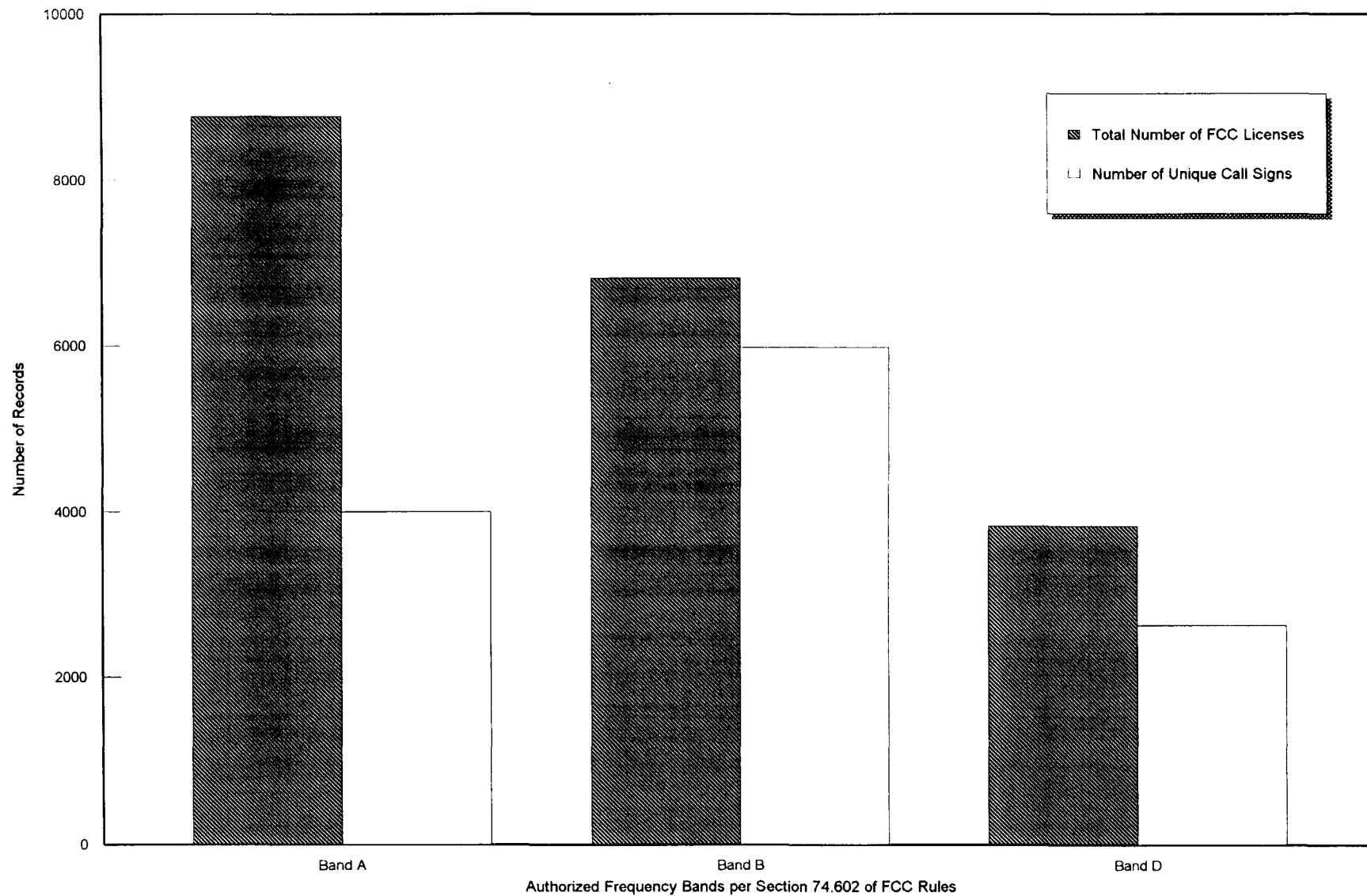
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Carl T. Jones, Jr., P.E.
President, Carl T. Jones Corporation

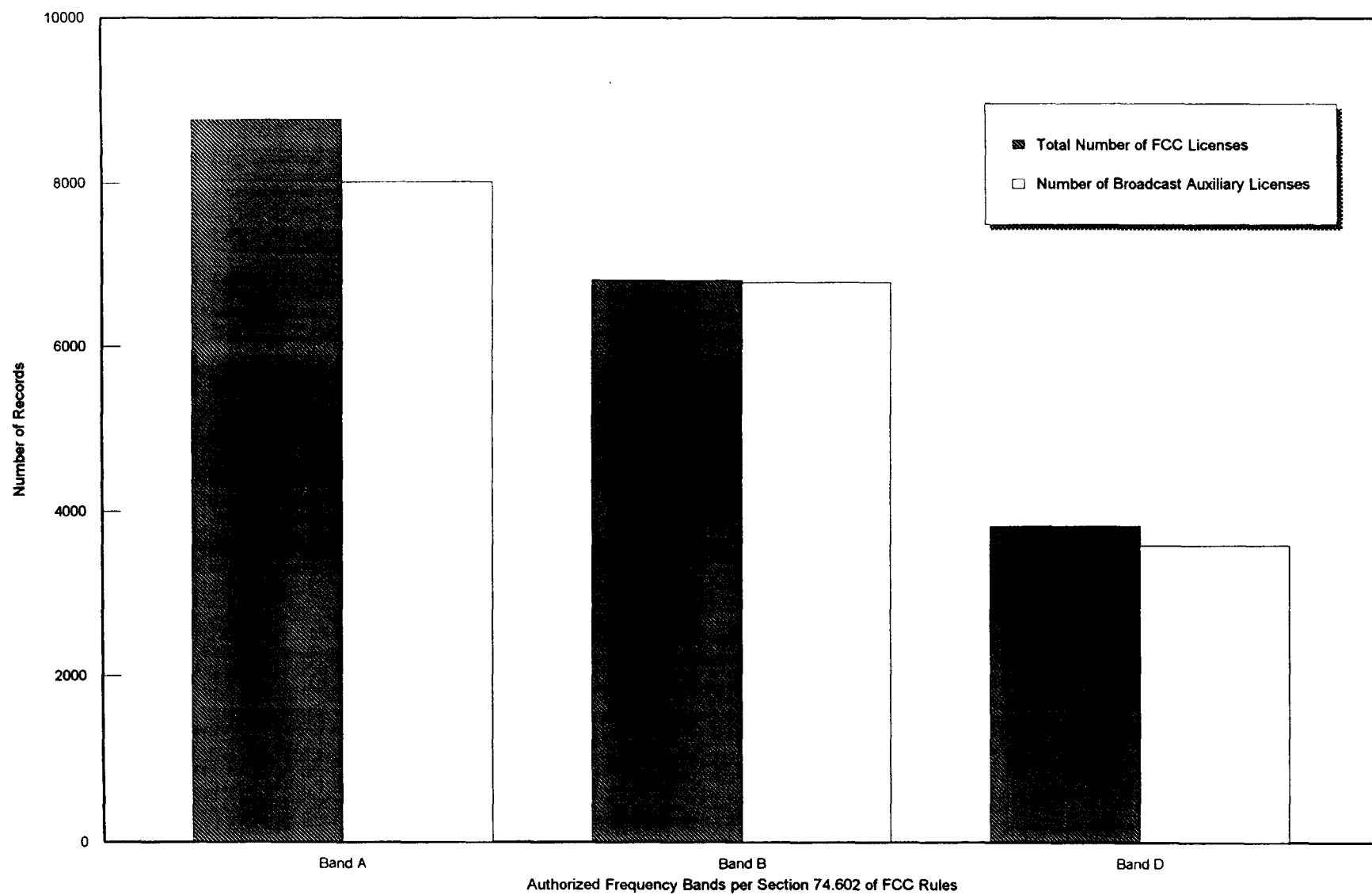


Total Number of FCC Licenses vs. Unique Call Sign Assignments in the Auxiliary TV Microwave Service Frequency Bands

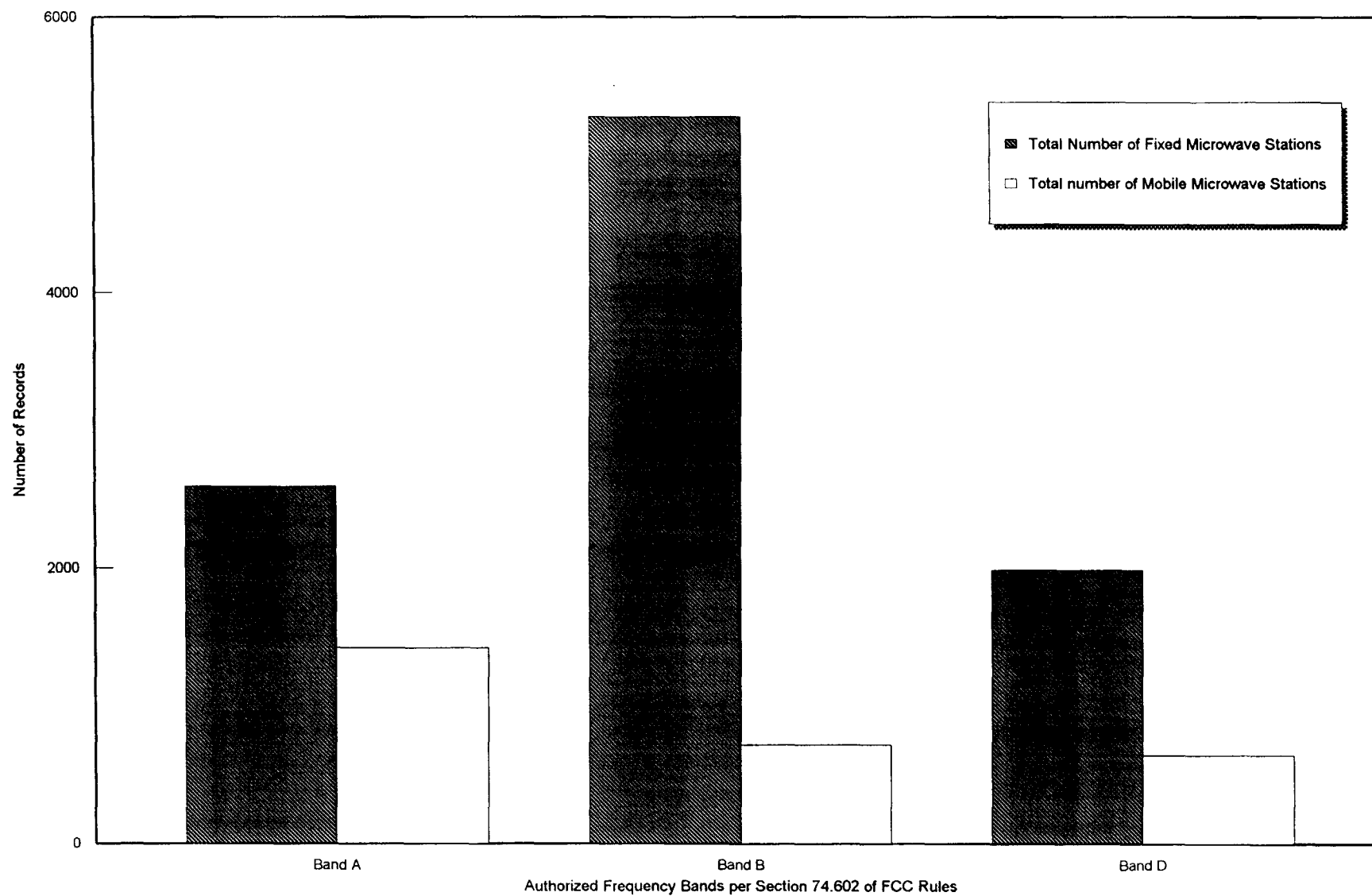


Total Number of FCC Licenses vs. Broadcast Auxiliary Licenses

in the Auxiliary TV Microwave Service Frequency Bands



Total Number of Fixed Stations vs. Mobile Stations in the Auxiliary TV Microwave Service Frequency Bands



Estimated Burden of Facility Migration and Associated Costs

Fixed BAS Stations

			Estimated Cost of relocating affected facilities to:		
Presently Licensed Frequency	Affected Channel(s)	Number of Affected Facilities	proposed 2110-2145 MHz segment	existing 6875-7125 MHz Band B	existing 12700-13250 MHz Band D
1990-2008 MHz	1	860	\$24,045,600	\$35,943,700	\$42,410,900
1990-2025 MHz	1&2	1076	\$30,084,960	\$44,971,420	\$53,062,940
1990-2110 MHz	1 through 7	2209	N/A	\$92,325,155	\$108,936,835

Estimated Burden of Facility Migration and Associated Costs

Mobile BAS Stations

					Estimated Cost of relocating affected facilities to:		
Presently Licensed Frequency	Affected Channel(s)	Affected Stations	Approximate. number of :		proposed 2110-2145 MHz segment	existing 6875-7125 MHz Band B	existing 12700-13250 MHz Band D
			ENG units	PORTABLES			
1990-2008 MHz	1	551	937	815	\$48,265,396	\$74,288,795	\$83,896,693
1990-2025 MHz	1&2	687	1168	1017	\$60,178,452	\$92,487,608	\$105,228,374
1990-2110 MHz	1 - 7	1134	1928	1678	N/A	\$152,302,824	\$175,340,592

APPENDIX A

FIXED BAS STATIONS
ESTIMATED COSTS

System Type: Fixed Microwave BAS**Frequency Band: 2110-2145 MHz**

	Cost
Transmitter	\$10,445
Transmission Line	
Connectors @ Transmit Terminal	
Transmitting Antenna	\$1,940
Receive Antenna	\$1,940
Transmission Line @ Receive Terminal	
Connectors @ Receive Terminal	
Receiver	\$8,135
FCC Application & Engineering	\$1,500
System Installation	\$4,000

System Type: Fixed Microwave BAS**Frequency Band: 6.875-7.125 GHz**

	Cost
Transmitter	\$10,745
Transmission Line	\$1,591
Connectors @ Transmit Terminal	\$580
Transmitting Antenna	\$2,220
Receive Antenna	\$2,220
Transmission Line @ Receive Terminal	\$6,364
Connectors @ Receive Terminal	\$580
Receiver	\$8,495
FCC Application & Engineering	\$3,000
System Installation	\$6,000

System Type: Fixed Microwave BAS

Frequency Band: 12.7-13.25 GHz

	Cost
Transmitter	\$10,395
Transmission Line	\$1,279
Connectors @ Transmit Terminal	\$580
Transmitting Antenna	\$2,180
Receive Antenna	\$2,180
Transmission Line @ Receive Terminal	\$5,116
Connectors @ Receive Terminal	\$580
Receiver	\$8,130
FCC Application & Engineering	\$3,500
System Installation	\$6,000

System Type: Fixed Microwave Repeater**Frequency Band: 12.7-13.25 GHz**

Transmitter	Cost
	\$10,395
Transmission Line	\$1,279
Connectors @ Transmit Terminal	\$580
Transmitting Antenna	\$2,180
Receive Antenna	\$2,180
Transmission Line @ Receive Terminal	\$5,116
Connectors @ Receive Terminal	\$580
Receiver	\$8,130
FCC Application & Engineering	\$1,500
System Installation	\$6,000

APPENDIX B

MOBILE BAS STATIONS
ESTIMATED COSTS

System Type: Mobile (ENG)

Frequency Band: 2110-2145 MHz

	Cost
Transmitter	\$8,500
Transmission Line	
Connectors @ Transmit Terminal	
Transmitting Antenna	
Receive Antenna	\$7,000
Transmission Line @ Receive Terminal	
Connectors @ Receive Terminal	
Receiver	\$11,500
FCC Application & Engineering	\$1,500
System Installation	\$4,000

System Type: Mobile (ENG)	
Frequency Band: 6.875-7.125 GHz	
Transmitter	Cost \$11,000
Transmission Line	\$1,500
Connectors @ Transmit Terminal	
Transmitting Antenna	\$5,000
Receive Antenna	\$3,400
Transmission Line @ Receive Terminal	\$6,364
Connectors @ Receive Terminal	\$580
Receiver	\$11,500
FCC Application & Engineering	\$1,500
System Installation	\$4,000

* Fully remote steerable receive antenna cost approx. \$50,000

System Type: Mobile (ENG)	
Frequency Band: 12.7-13.25 GHz	
Transmitter	Cost \$11,500
Transmission Line	\$1,500
Connectors @ Transmit Terminal	
Transmitting Antenna	\$1,700
Receive Antenna	\$3,400
Transmission Line @ Receive Terminal	\$5,116
Connectors @ Receive Terminal	\$580
Receiver	\$11,500
FCC Application & Engineering	\$1,500
System Installation	\$4,000

* Fully remote steerable receive antenna cost approx. \$50,000

System Type: ENG Receive Site

Frequency Band: 2110-2145 MHz

	Cost
Transmitter	
Transmission Line	
Connectors @ Transmit Terminal	
Transmitting Antenna	
Receive Antenna	\$7,000
Transmission Line @ Receive Terminal	
Connectors @ Receive Terminal	
Receiver	\$11,500
FCC Application & Engineering	
System Installation	\$2,000

System Type: ENG Receive Site**Frequency Band: 6.875-7.125 GHz**

	Cost
Transmitter	
Transmission Line	
Connectors @ Transmit Terminal	
Transmitting Antenna	
Receive Antenna	\$3,400
Transmission Line @ Receive Terminal	\$3,182
Connectors @ Receive Terminal	\$580
Receiver	\$11,500
FCC Application & Engineering	
System Installation	\$2,000

System Type: ENG Receive Site

Frequency Band: 12.7-13.25 GHz

	Cost
Transmitter	
Transmission Line	
Connectors @ Transmit Terminal	
Transmitting Antenna	
Receive Antenna	\$3,400
Transmission Line @ Receive Terminal	\$2,558
Connectors @ Receive Terminal	\$580
Receiver	\$11,500
FCC Application & Engineering	
System Installation	\$2,000

System Type: Portable (Tripod to Van)

Frequency Band: 2110-2145 MHz

Transmitter	Cost \$8,500
Transmission Line	
Connectors @ Transmit Terminal	
Transmitting Antenna	
Receive Antenna	
Transmission Line @ Receive Terminal	
Connectors @ Receive Terminal	
Receiver	\$11,500
FCC Application & Engineering	
System Installation	